

COMP 110/L Lecture 3

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Outline

- **Types** (`int` and `String`)
- **String concatenation**
- **Variables**
- **User input**

Types

Expressions

- From the last lab, you wrote code like:
 - `"Hello, world!"`
 - `2 * (1 + 4)`
- Each of these is an expression (produces a value)

Types

- All values are of a particular type
 - `"Hello, world!"`: `String`
 - `2 * (1 + 4)`: `int (integers)`
- Transitively, all expressions are of a particular type

String Concatenation

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Strings can be combined together with the + operator.

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```
"foo" + "bar"
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```
"foo" + "bar" + "baz"
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```
"foo" + "bar"
```

```
"foobar"
```

```
"foo" + "bar" + "baz"
```

```
"foobarbaz"
```

Demo:

`StringConcat.java`

Concatenation with `int`

String concatenation also works with
Strings and integers (`int`).

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```
"foo" + 7
```

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```
"foo" + 7
```

```
"foo7"
```

Concatenation with `int`

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Strings and integers (`int`).

```
"foo" + 7
```

```
"foo7"
```

```
"bar" + 28
```


Concatenation with `int`

String concatenation also works with
Strings and integers (`int`).

```
"foo" + 7
```

```
"foo7"
```

```
"bar" + 28
```

```
"bar28"
```

Demo:

`IntStringConcat.java`

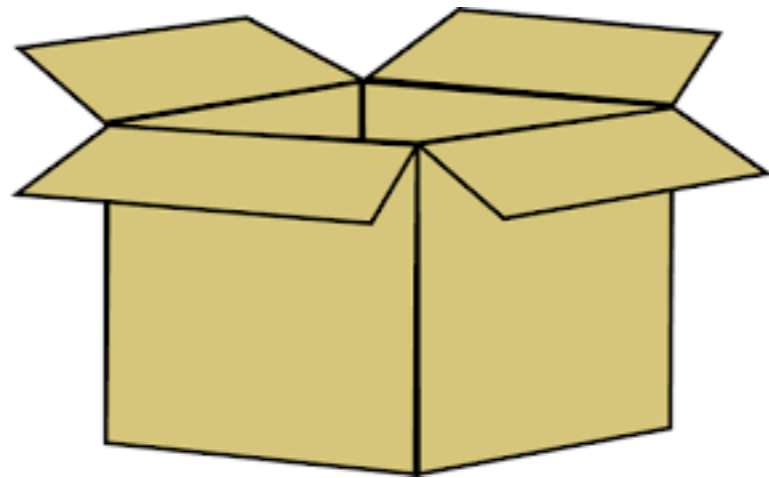
Variables

Variables

- Related to variables in math
- A named “box” you can put a value in

Variables

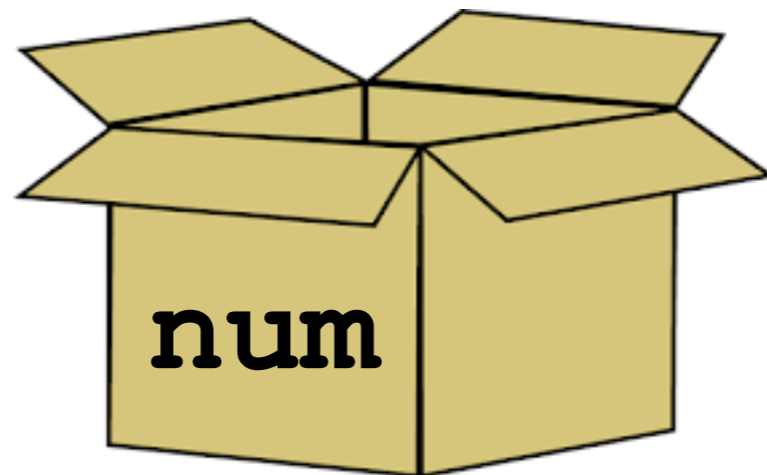
- Related to variables in math
 - A named “box” you can put a value in
-



-I have a box (a variable)...

Variables

- Related to variables in math
 - A named “box” you can put a value in
-

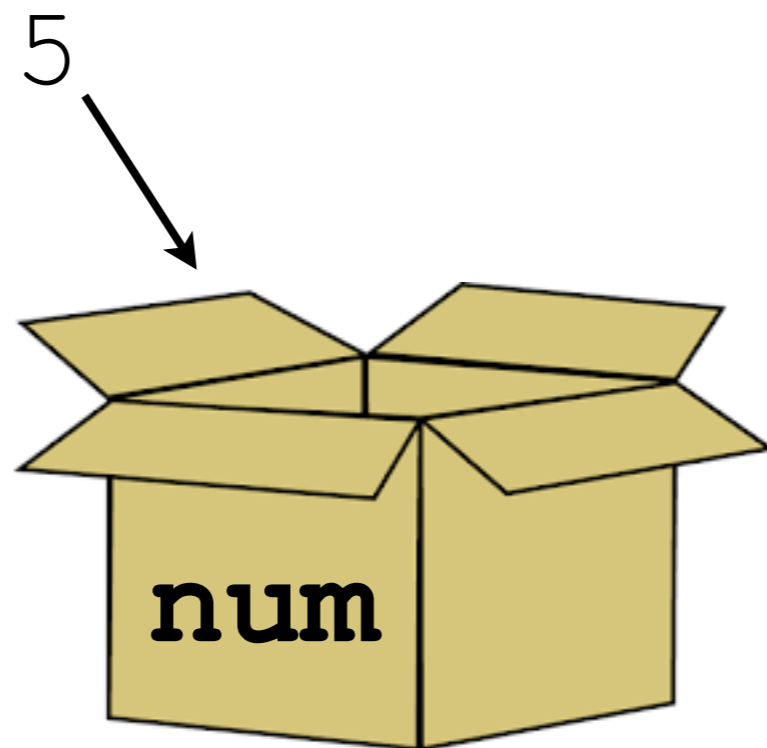


–...and I’m going to name my box “num”

–I can name a box just about anything I want, though usually the name should reflect the sort of thing I want to put into the box

Variables

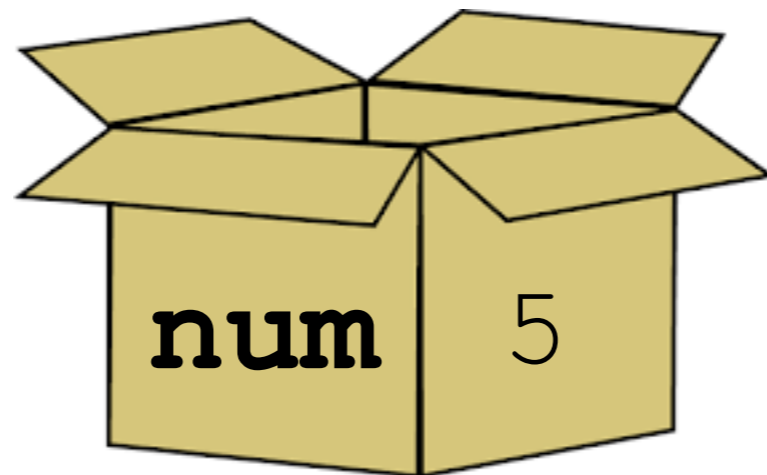
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-I can then put a value into this box. In this case, I put the value 5

Variables

- Related to variables in math
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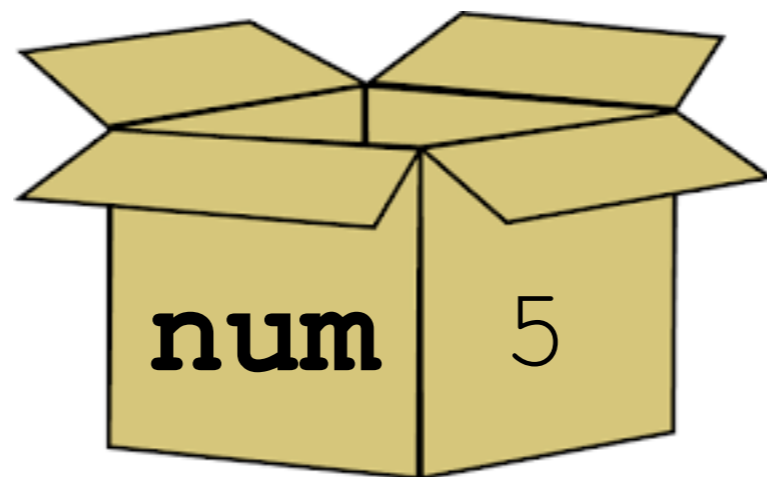


-The box retains the value I put into it. In this case, I put in 5, so it holds 5.

Variables

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- A named “box” you can put a value in

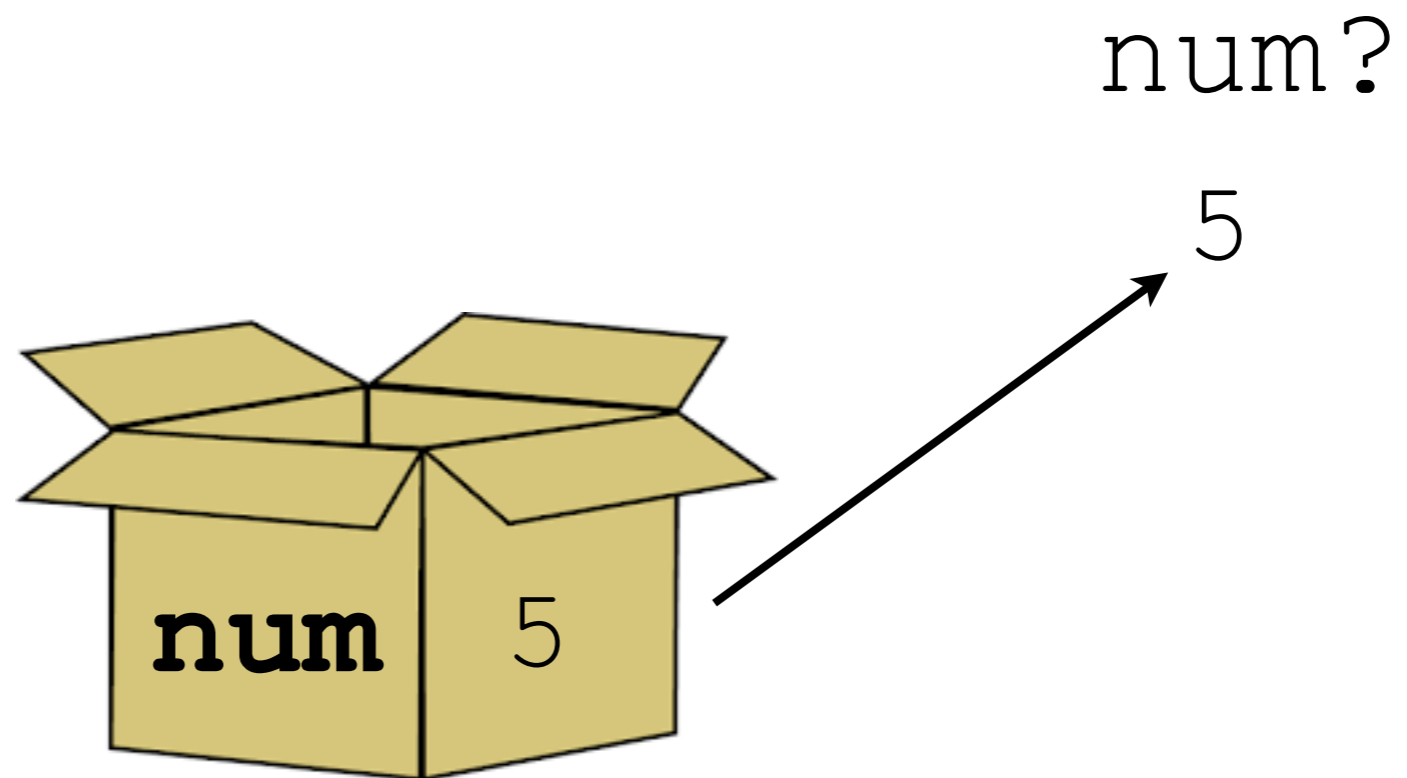
num?



-Later on, I can easily retrieve the value that is in the box

Variables

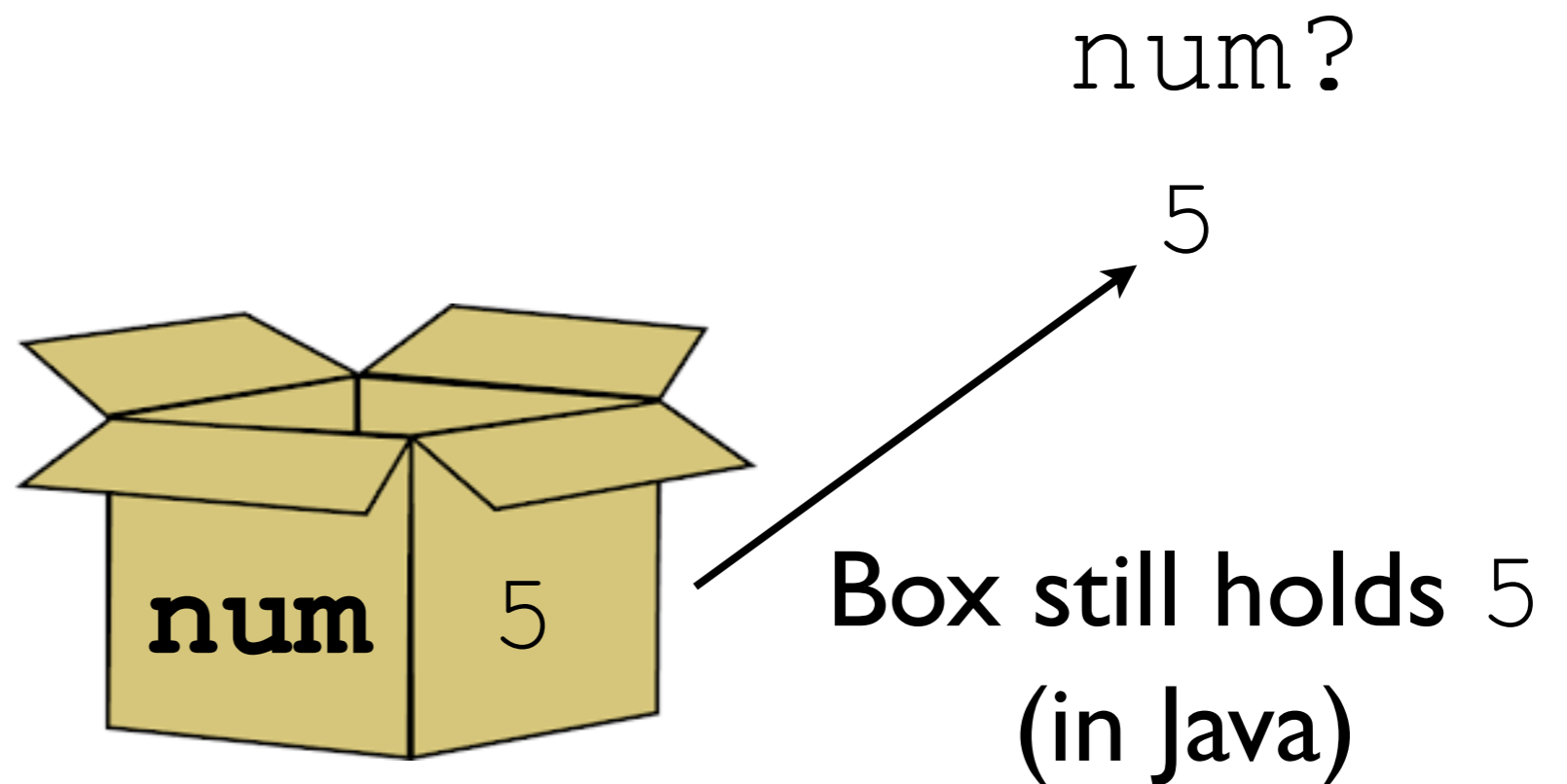
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-Later on, I can easily retrieve the value that is in the box

Variables

- Related to variables in math
- A named “box” you can put a value in



-In Java, the box will retain the value within

-Some languages may or may not retain the value in the box if you ask for the value (C++ gets strange here depending on the context you asked for the value, and usually the box will be empty in Rust)

Getting a Box

In Java, we must *declare a variable* to get a new box.

Part of this declaration includes the *type* of the thing we want to put into the box.

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Variable named `num`, holds values of type `int`

Getting a Box

In Java, we must *declare a variable* to get a new box. Part of this declaration includes the *type* of the thing we want to put into the box.

```
int num;
```

Variable named `num`, holds values of type `int`

```
String str;
```

Variable named `str`, holds values of type `String`

Example:

`VariableDeclarations.java`

Putting Values in the Box

- To put values into variables, we *assign into* them
- Assignment is performed with =

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```
int num;  
num = 7;
```

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- Assignment is performed with =

```
int num;  
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Retrieving Values from the Box

- To get a value out of a variable, we need to *access* it
- Variable access is done by referencing a variable in an expression context

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```
int num = 7;  
int otherNum = num;  
int thirdNum = num + otherNum;
```

Example:

`VariableUsage.java`

Question

- Variables can have their values *reassigned*
- Question: what might this code snippet print?

```
int num = 9;  
num = 12;  
System.out.println(num);
```


Question

- Variables can have their values *reassigned*
- Question: what might this code snippet print?

```
int num = 9;  
num = 12;  
System.out.println(num);
```

Answer: 12

User Input

Program Input

- Programs without input can't do much
 - Can only produce predetermined values
- We'll look at one kind of input: user input from the console/terminal

Reading in Input

New bit of magic: Scanner

Reading in Input

New bit of magic: Scanner

```
import java.util.Scanner;  
  
public class Test {  
    public static void  
    main(String[] args) {  
        Scanner in =  
            new Scanner(System.in);  
        ...  
    }  
}
```

- The code above creates a Scanner, assigning it into variable in
- Once the Scanner is created, you can do things with it.

Reading in Integers (int)

```
Scanner in = new Scanner(System.in);  
int first = in.nextInt();  
int second = in.nextInt();  
int third = in.nextInt();  
  
// above code reads in  
// three integers from the user
```

Demo:

AddTwo.java

Reading in Text (String)

```
Scanner in = new Scanner(System.in);  
String firstLine = in.nextLine();  
String secondLine = in.nextLine();  
  
// above code reads in two lines  
// of text
```


Demo:

Parrot.java

Demo:

DoubleParrot.java